CLAIMS

What is claimed is

1. A method of identifying an agent that binds to mosquito olfaction molecules, comprising:

a) providing an isolated mosquito olfaction molecule;

b) contacting a test agent with the isolated mosquito olfaction molecule; and

c) detecting specific binding of the test agent to the isolated mosquito olfaction molecule,

wherein the presence of specific binding identifies the test agent as a mosquito olfaction molecule binding compound.

2. The method of claim 1, wherein the isolated mosquito olfaction molecule further comprises a polypeptide having an amino acid sequence selected from the group consisting of SEQ ID NO: 2, SEQ ID NO. 4, SEQ ID NO. 6, SEQ ID NO. 8, SEQ ID NO. 14, SEQ ID NO. 16, SEQ ID NO. 18, and SEQ ID NO. 20.

3. The method of claim 1, wherein contacting the test agent with the isolated mosquito olfaction molecule further comprises contacting under native conditions.

4. The method of claim 1, wherein detecting specific binding of the test agent to the isolated mosquito olfaction molecule further comprises immunoprecipitation.

5. The method of claim 4, wherein the isolated mosquito olfaction molecule comprises a polypeptide selected from a group consisting of : SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, and SEQ ID NO: 20.

6. The method of claim 4, wherein isolated mosquito olfaction molecule comprises a polypeptide selected from a group consisting of: conservatively modified SEQ ID NO: 2, conservatively modified SEQ ID NO: 4, conservatively modified SEQ ID NO: 6, conservatively modified SEQ ID NO: 8, conservatively modified SEQ ID NO: 14, conservatively modified SEQ ID NO: 16, conservatively modified SEQ ID NO: 18, and conservatively modified SEQ ID NO: 20.

7. A method of identifying a compound that inhibits binding of a mosquito arrestin to a mosquito odorant receptor, comprising:

providing an antibody that binds to an isolated mosquito olfaction molecule;

providing a mosquito olfaction molecule binding compound;

providing a test sample;

combining the mosquito olfaction molecule binding compound, the antibody, and the test sample in reaction conditions that allow a complex to form in the absence of the mosquito olfaction molecule binding compound, wherein the complex includes the mosquito arrestin and the mosquito odorant receptor; and

determining whether the mosquito olfaction molecule binding compound decreases the formation of the complex, wherein a decrease indicates that the

mosquito olfaction molecule binding compound is a compound that inhibits the binding of mosquito arrestin to mosquito odorant receptor.

8. The method of claim 7, wherein 2-hybrid analysis is used to identify a compound that inhibits the binding of mosquito arrestin to a mosquito odorant receptor.

9. The method of 8, wherein a GAL4 binding domain is linked to an arrestin fragment.

10. The method of claim 9, wherein a GAL4 transactivation domain is linked to an odorant receptor fragment.

11. The method of claim 7, wherein co-immunoprecipitation is used to determine whether the mosquito olfaction molecule binding compound decreases the formation of the complex.

12. The method of claim 11, wherein the antibody binds to a polypeptide having an amino acid sequence selected from the group consisting of SEQ ID NO 2 and conservatively modified SEQ ID NO 2.

13. An isolated polynucleotide comprising a sequence selected from the group consisting of:

a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 2;

a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 2;

a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 2; and

a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 1, or the complement of SEQ ID NO: 1.

14. The isolated polynucleotide of claim 13, comprising a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 2.

15. The isolated polynucleotide of claim 13, comprising a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 2.

16. The isolated polynucleotide of claim 13, comprising a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 2.

17. The isolated polynucleotide of claim 13, comprising a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 1, or the complement of SEQ ID NO: 1.

18. A purified polypeptide comprising a sequence selected from the group consisting of:

an amino acid sequence of SEQ ID NO: 2;

an amino acid sequence of conservatively modified SEQ ID NO: 2; and

an amino acid sequence of SEQ ID NO: 2, having at least 20 consecutive residues.

19. The purified polypeptide of claim 18, comprising an amino acid sequence of SEQ ID NO: 2.

20. The purified polypeptide of claim 18, comprising an amino acid sequence of conservatively modified SEQ ID NO: 2.

21. The purified polypeptide of claim 18, comprising an amino acid sequence of SEQ ID NO: 2, having at least 20 consecutive residues.

22. An isolated polynucleotide comprising a sequence selected from the group consisting of:

a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 4;

a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 4;

a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 4; and

a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 3, or the complement of SEQ ID NO: 3.

23. The isolated polynucleotide of claim 22, comprising a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 4.

24. The isolated polynucleotide of claim 22, comprising a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 4.

25. The isolated polynucleotide of claim 22, comprising a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 4.

26. The isolated polynucleotide of claim 22, comprising a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 3, or the complement of SEQ ID NO: 3.

27. A purified polypeptide comprising a sequence selected from the group consisting of:

an amino acid sequence of SEQ ID NO: 4;

an amino acid sequence of conservatively modified SEQ ID NO: 4; and

an amino acid sequence of SEQ ID NO: 4, having at least 20 consecutive residues.

28. The purified polypeptide of claim 27, comprising an amino acid sequence of SEQ ID NO: 4.

29. The purified polypeptide of claim 27, comprising an amino acid sequence of conservatively modified SEQ ID NO: 4.

30. The purified polypeptide of claim 27, comprising an amino acid sequence of SEQ ID NO: 4, having at least 20 consecutive residues.

31. An isolated polynucleotide comprising a sequence selected from the group consisting of:

a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 6;

a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 6;

a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 6; and

a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 5, or the complement of SEQ ID NO: 5.

32. The isolated polynucleotide of claim 31, comprising a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 6.

33. The isolated polynucleotide of claim 31, comprising a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 6.

34. The isolated polynucleotide of claim 31, comprising a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 6.

35. The isolated polynucleotide of claim 31, comprising a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 5, or the complement of SEQ ID NO: 5.

36. A purified polypeptide comprising a sequence selected from the group consisting of:

an amino acid sequence of SEQ ID NO: 6;

an amino acid sequence of conservatively modified SEQ ID NO: 6; and

an amino acid sequence of SEQ ID NO: 6, having at least 20 consecutive residues.

37. The purified polypeptide of claim 36, comprising an amino acid sequence of SEQ ID NO: 6.

38. The purified polypeptide of claim 36, comprising an amino acid sequence of conservatively modified SEQ ID NO: 6.

39. The purified polypeptide of claim 36, comprising an amino acid sequence of SEQ ID NO: 6, having at least 20 consecutive residues.

40. An isolated polynucleotide comprising a sequence selected from the group consisting of:

a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 8;

a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 8;

a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 8; and

a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 7, or the complement of SEQ ID NO: 7.

41. The isolated polynucleotide of claim 40, comprising a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 8.

42. The isolated polynucleotide of claim 40, comprising a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 8.

43. The isolated polynucleotide of claim 40, comprising a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 8.

44. The isolated polynucleotide of claim 40, comprising a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 7, or the complement of SEQ ID NO: 7.

45. A purified polypeptide comprising a sequence selected from the group consisting of:

an amino acid sequence of SEQ ID NO: 8;

an amino acid sequence of conservatively modified SEQ ID NO: 8; and

an amino acid sequence of SEQ ID NO: 8, having at least 20 consecutive residues.

46. The purified polypeptide of claim 45, comprising an amino acid sequence of SEQ ID NO: 8.

47. The purified polypeptide of claim 45, comprising an amino acid sequence of conservatively modified SEQ ID NO: 8.

48. The purified polypeptide of claim 45, comprising an amino acid sequence of SEQ ID NO: 8, having at least 20 consecutive residues.

49. An isolated polynucleotide comprising a sequence selected from the group consisting of:

a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 14;

a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 14;

a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 14; and

a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 13, or the complement of SEQ ID NO: 13.

50. The isolated polynucleotide of claim 49, comprising a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 14.

51. The isolated polynucleotide of claim 49, comprising a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 14.

52. The isolated polynucleotide of claim 49, comprising a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 14.

53. The isolated polynucleotide of claim 49, comprising a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 13, or the complement of SEQ ID NO: 13.

54. A purified polypeptide comprising a sequence selected from the group consisting of:

an amino acid sequence of SEQ ID NO: 14;

an amino acid sequence of conservatively modified SEQ ID NO: 14; and

an amino acid sequence of SEQ ID NO: 14, having at least 20 consecutive residues.

55. The purified polypeptide of claim 54, comprising an amino acid sequence of SEQ ID NO: 14.

56. The purified polypeptide of claim 54, comprising an amino acid sequence of conservatively modified SEQ ID NO: 14.

57. The purified polypeptide of claim 54, comprising an amino acid sequence of SEQ ID NO: 14, having at least 20 consecutive residues.

58. An isolated polynucleotide comprising a sequence selected from the group consisting of:

a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 16;

a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 16;

a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 16; and

a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 15, or the complement of SEQ ID NO: 15.

59. The isolated polynucleotide of claim 58, comprising a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 16.

60. The isolated polynucleotide of claim 58, comprising a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 16.

61. The isolated polynucleotide of claim 58, comprising a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 16.

62. The isolated polynucleotide of claim 58, comprising a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 15, or the complement of SEQ ID NO: 15.

63. A purified polypeptide comprising a sequence selected from the group consisting of:

an amino acid sequence of SEQ ID NO: 16;

an amino acid sequence of conservatively modified SEQ ID NO: 16; and

an amino acid sequence of SEQ ID NO: 16, having at least 20 consecutive residues.

64. The purified polypeptide of claim 63, comprising an amino acid sequence of SEQ ID NO: 16.

65. The purified polypeptide of claim 63, comprising an amino acid sequence of conservatively modified SEQ ID NO: 16.

66. The purified polypeptide of claim 63, comprising an amino acid sequence of SEQ ID NO: 16, having at least 20 consecutive residues.

67. An isolated polynucleotide comprising a sequence selected from the group consisting of:

a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 18;

a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 18;

a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 18; and

a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 17, or the complement of SEQ ID NO: 17.

68. The isolated polynucleotide of claim 67, comprising a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 18.

69. The isolated polynucleotide of claim 67, comprising a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 18.

70. The isolated polynucleotide of claim 67, comprising a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 18.

71. The isolated polynucleotide of claim 67, comprising a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 17, or the complement of SEQ ID NO: 17.

72. A purified polypeptide comprising a sequence selected from the group consisting of:

an amino acid sequence of SEQ ID NO: 18;

an amino acid sequence of conservatively modified SEQ ID NO: 18; and

an amino acid sequence of SEQ ID NO: 18, having at least 20 consecutive residues.

73. The purified polypeptide of claim 72, comprising an amino acid sequence of SEQ ID NO: 18.

74. The purified polypeptide of claim 72, comprising an amino acid sequence of conservatively modified SEQ ID NO: 18.

75. The purified polypeptide of claim 72, comprising an amino acid sequence of SEQ ID NO: 18, having at least 20 consecutive residues.

76. An isolated polynucleotide comprising a sequence selected from the group consisting of:

a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 20;

a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 20;

a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 20; and

a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 19, or the complement of SEQ ID NO: 19.

77. The isolated polynucleotide of claim 76, comprising a nucleotide sequence encoding a polypeptide comprising an amino acid sequence of SEQ ID NO: 20.

78. The isolated polynucleotide of claim 76, comprising a nucleotide sequence encoding a polypeptide comprising at least 20 consecutive residues of the amino acid sequence of SEQ ID NO: 20.

79. The isolated polynucleotide of claim 76, comprising a nucleotide sequence encoding a polypeptide comprising a conservatively modified amino acid sequence of SEQ ID NO: 20.

80. The isolated polynucleotide of claim 76, comprising a nucleotide sequence that hybridizes under stringent conditions to a hybridization probe the nucleotide sequence of which consists of SEQ ID NO: 19, or the complement of SEQ ID NO: 19.

81. A purified polypeptide comprising a sequence selected from the group consisting of:

an amino acid sequence of SEQ ID NO: 20;

an amino acid sequence of conservatively modified SEQ ID NO: 20; and

an amino acid sequence of SEQ ID NO: 20, having at least 20 consecutive residues.

82. The purified polypeptide of claim 81, comprising an amino acid sequence of SEQ ID NO: 20.

83. The purified polypeptide of claim 81, comprising an amino acid sequence of conservatively modified SEQ ID NO: 20.

84. The purified polypeptide of claim 81, comprising an amino acid sequence of SEQ ID NO: 20, having at least 20 consecutive residues.

85. A method of modulating arrestin 1 biological activity, the method comprising:

administering an arrestin 1 biological activity-modulating amount of a mosquito olfaction molecule binding compound;

contacting the arrestin 1 with the mosquito olfaction molecule binding compound; and

modulating arrestin 1 biological activity through the arrestin 1 contact with the mosquito olfaction molecule binding compound.